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EROSION CONTROL & WILDLIFE PLANTING GUIDE

NATIONAL FORESTS IN MISSISSIPPI

U. S DEPARTMENT OF AGRICULTURE
FOREST SERVICE • SOUTHERN REGION

EROSION CONTROL AND WILDLIFE PLANTING GUIDE

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EROSION CONTROL GUIDE - NATIONAL FORESTS IN MISSISSIPPI

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Introduction

Erosion Control activities offer excellent opportunities to benefit wildlife through artificial plantings.....

This guide is intended as an aid in erosion control work planning, and the coordination of wildlife management with erosion control through species selection. The information contained herein was compiled to (1) guide selection of plants that will benefit wildlife and accomplish erosion control objectives, (2) reference artificial plantings beneficial to wildlife, and (3) provide guidelines for planting dates, seeding rates, and general fertilization rates.

The planting tables list the more important wildlife and erosion control plants suited for Mississippi. They were compiled after consultation with personnel of the U S Forest Service, Mississippi Game and Fish Commission and Soil Conservation Service, Extension Service, and private individuals. They are intended to be broad enough to cover the entire National Forests in Mississippi. All erosion control/wildlife plantings should be selected from the species and combinations of species in these planting tables. Some minor variations in planting dates from North Mississippi to South Mississippi are expected.

Area Stabilization

Before restoration work can begin, the area to be treated will be protected from excessive surface water runoff. This may require grading and sloping of cuts, filling in of ruts, etc., as well as construction of water bars, water dips, brush dams, diversion terraces, riprap, and other methods to prevent a buildup of water velocity and quantity over the eroded area. The runoff will be dispersed as much and as soon as possible.

Soil erosion results from two independent processes - (1) detachment of soil particles and (2) transportation of soil particles. During rainstorms soil is detached by raindrops and by water flowing over the surface. Splash of raindrops on bare soil detaches most of the soil removed by sheet erosion. Surface flow detaches most of the soil removed by rill and gully erosion. In general, clays are hard to detach but easy to transport while the reverse is usually true of sands.

Water derives its power to erode soil from the velocity imparted by gravity.

In general:

1. Increasing the gradient four times doubles the velocity of the water.

2. Doubling the water velocity increases its erosive power four times.

3. The quantity of material of a given size that can be transported by water varies according to the velocity of the water. If the velocity is doubled, the amount that can be carried is increased 32 times.

4. The size of particles which may be rolled or pushed by the action of water also varies with its velocity. If the velocity is doubled, the size of the particles which can be moved is increased 64 times.

   Average water velocity required to carry, sweep or roll various size particles is shown in the following table.

Average Velocity in Feet Per Second	Material
0.25	Fine Clay
0.50	Fine Sand
0.67	Coarse Sand
1.0	Fine Gravel
2.0	Pebbles up to 1" in diameter
3.0	Slippery, angular egg sized stones

Flowing water is such a moving force because:

1. It is heavy, 8 1/2 pounds per gallon or 62.4 pounds per cubic foot. Muddy water is of course even heavier. Weight of water is a major reason for its ability to move rocks and smaller particles of earth. Also, rock will lose nearly 1/3 of its weight when in water.

2. The fluid flexibility and lubricating action of water allows force to be exerted from various angles and facilitates loosening and movement of particles.

3. Floating or rolling objects moving with water give jarring and abrasive action which is effective in loosening soil particles.

4. Moving water is an effective moving force because there is so much of it. For example, one inch of rainfall on an acre equals 27,158 gallons or 226,651 pounds.

The above should explain why even if an eroded area is successfully revegetated the erosion will begin again if the water is not dispersed and the velocity is not slowed.

Location and number of water bars, brush dams and the like will depend on terrain and volume of water expected on an area. As a rule, the more erosive the soil and the steeper the gradient, the more structures that will be needed. Abandoned logging roads have proved to be a serious source of erosion because the networks of logging spurs and skid trails left after timber cutting may cause severe erosion by catching surface runoff and leading it with an ever increasing concentration of erosive power until it reaches a stream.

Water bars will be the primary structure used on abandoned roads, skid trails, etc. One water bar should be put in for every 4 foot change in elevation with at least one bar for every 500 feet of horizontal distance. A water bar is not a dam - it is a water diversion structure. Therefore,

provision must be made to allow the water stopped by the bar to move off the road or trail and disperse itself over the adjoining stabilized area. If this is not done, in a short period of time the water flow over the bar will cut the bar down to ground level and gullying will begin. Water may be removed by a short (the shorter the better) diversion ditch or possibly by extending the bar somewhat beyond the road. A water bar built bank to bank, in the middle of a deep cut with no provision made to remove the water off the road or trail, is useless.

Handling the runoff for gully control will differ according to type and size of gully and the drainage area as well as the gully itself when the gully was caused by poor watershed conditions. If the watershed is in satisfactory condition, only treatment of the gully will be needed. Control methods which may be considered are:

1. Retention and infiltration of runoff on the drainage area.

2. Diversion of runoff above the gullied area.

3. Control of runoff in the gully.

A combination of the above may be used. All methods will require construction of some type of structure if grading is not possible.

Retention and infiltration of runoff on the drainage area could be brought about by the construction of dams, terraces, etc., large enough to hold the water and silt on the area.

Where practical,diversion of runoff above the gullied area should be done before control is attempted in the gully. Such diversion may be by means of ditches, terrace type ditches, dikes, ditch and dike, or any other method which will divert runoff from the gully heads. Diversion structures must be located on stable slopes far enough above the gully head to prevent sloughing into the head.

They must be large enough to carry the maximum amount of water expected and be on a gentle enough grade so that runoff velocity will not cause further erosion.

Control of runoff in the gully may be by means of brush dams, brush fills (where the gully is filled with brush, for small gullies only), check dams and any other structure which will allow vegetation to become established. Vegetation is more difficult to establish in a gully carrying runoff than in one from which runoff has been diverted. The entire purpose of the above structures are to make possible the establishment of vegetation. Many low check dams are better than one or two large structures. Dams should be made so that any excess water flows over the center of the dam rather than around the ends.

In small gullies, the eroding water channel may be sodded, paved, etc. Any method which will prevent further soil movement is suitable.

Fertilization and Liming

Fertilizing and liming rates given in the planting tables are general, and should be used only when soil testing is not possible. Soil testing may save money, and will help to insure the correct fertilization for good stands. A free soil testing servise is available at Mississippi State University through the local county agent's office.

On sensitive areas, it is desirable to top dress about six weeks after planting with 200 lbs. per acre of Ammonium Nitrate (33-0-0), in addition to the initial fertilization. Where continued planted stands are desired (pond levees, severely eroded areas, etc.), fertilize every 1 to 2 years, and lime every 3 to 4 years, as needed to maintain vigor.

Soil testing will indicate the need for liming. In general, the need for lime is more critical on the DeSoto National Forest than in other areas, and where legumes are planted. Basic slag may be substituted for lime. When using slag, apply one-half the recommended lime rate. Lime will last for 3 to 4 years,where slag's effect usually does not last past one year.

In areas where the natural topsoil has been removed and soil testing is not possible, increase the fertilizer and lime rates by about 1.5 to 2 times. Also, additional fertilizer applications are usually necessary to ensure continued growth.

Seedbed Preparation

The importance of a good seedbed cannot be overemphasized. Proper seedbed preparation is necessary to insure good results. After the fertilizer has been spread, the area is tilled to produce two to four inches of loose soil. The seed is then sown on this bed. Seed must be sown after the soil is broken up - if it is sown before, it will be too deep for good germination.

Seeding and Seed

Seed should be sown during the season specified in the section describing the various grasses. It should not be sown when the ground is frozen or weather is windy enough to affect the sowing operation. Application should be by mechanical means such as a cyclone seeder. Soil should be firmed around the seed immediately after sowing, particularly on slopes.

Any leguminous seed used will be inoculated with nitrogen fixing bacteria. No seed used will be over one year old at time of sowing. Seed used will meet the specified germination and purity requirements.

In determining the number of pounds of seed to use in any desired mixture, it is helpful to figure how many live pure seeds there will be of the various species per square foot. This is necessary so equal, if desired, amounts of seed are sown. For example, you could have a mixture of 10 pounds of seed A and 10 pounds of seed B, seemingly an even mixture. However, seed A cound have 5,000,000 seeds per pound and seed B could have 200,000. Thus on the ground, instead of an even mixture, you actually have a one in

twenty-five mix. The following steps may be used to calculate the number of live pure seed per square foot sown. Seed purity in percent is first multiplied by germination percent and divided by 100 which gives the percent of live pure seed. Thus, if the seed analysis gives a purity of 80% and a germination of 70%, the live pure seed content is 80 x 70 divided by 100 = 56% LPS. Thus, 56% of each pound of seed A will be expected to germinate as seed A.

To find the number of live pure seed per square foot, if sown at a rate of one pound per acre, simply multiply the LPS times number of seed per pound and divide by square feet in an acre.

$$\frac{56\% \times 500{,}000 \text{ seed}}{43{,}560 \text{ sq ft}} = 6.4 \text{ LPS per square foot if one pound of seed A is used per acre.}$$

Thus it is possible to determine the number of seedlings per square foot so proper grass density, not too thick and not too thin will result from the seeding operation. Fifty to one hundred seeds per square foot should be satisfactory.

Species to use for erosion control will depend as does any other plant on site, soils, moisture conditions and so on. The following species are listed along with their site requirements, and general characteristics so that the District Ranger may tailor the species to fit the site to be seeded. It may be of help in determining the cause of any seeding failure.

An important factor in determining the growth of grasses is soil acidity. In forested areas of heavy rainfall such as Mississippi, soils tend to become acid, thus only those grasses tolerant to acid soils can be successfully grown in the State unless lime is used.

Mulching

The application of mulch is almost always desirable, and in many cases, essential to a successful stand. The benefits of a good mulching material, properly applied,are many. It helps prevent erosion while the vegetation is becoming established, conserves soil moisture, and insulates the soil surface from extreme temperatures. Temperatures under mulches during hot weather have been found to be as much as 30 to 50 degrees F.lower than on bare, unprotected soil. During cold weather mulch serves to keep the seedbed warmer.

Approved mulch should be applied at the rate of 1 1/2 tons per acre, evenly distributed. This rate of application is Forest wide. In its final position mulch should be loose enough to allow air circulation but compact enough to shade and cover the ground.

Vegetative materials used for mulch shall be either wheat straw, oat straw, sedge, pine straw or hay. On Districts or areas where grazing is a problem, the preferred mulch will be broom sedge straw or pine straw.

General

The following points should be considered before work plans on an area are completed. They will seldom all apply to any one job, but one or more will apply to almost any type work.

a. Plan to expose the least bare soil possible in order to do the job.

b. Plan to expose the soil for the shortest possible time. Have revegetation work scheduled.

c. If necessary, stabilize critical areas while the work being done on the area is still in progress,with temporary mulch or permanent vegetation.

d. Install sediment basins to trap sediment where needed.

e. Establish permanent vegetation at once after work is completed.

f. When constructing improvements, plan the improvement to fit topography and soils and make maximum practical use of existing vegetation.

g. The effect of planned work on the soil and water resources will be considered in all work planned, permits issued, etc.

The following table was prepared from work done on 3% slopes at the Coastal Plains Experiment Station, Tifton, Georgia, over a 3 year period. It shows the importance of proper ground cover in reducing runoff and soil loss.

Crop or Land Cover	Average Rainfall in Inches	Yearly Water Runoff Inches	Yearly Soil Loss Tons/Ac
Sod	41.69	0.21	0.15
Corn	41.69	1.95	0.81
Harrowed Bare Soil	41.69	10.85	1.20

Cattle Grazing

It is difficult to establish plantings where cattle graze. A Plant's susceptibility to cattle grazing has been rated in the planting tables. The ratings are relative to the other plants listed. Regardless of the cattle stocking, cattle will concentrate on a planting; thus reducing or eliminating any plant's wildlife or erosion control value.

Where cattle graze on a rotational basis or 7 month permit, erosion work during the off season will allow for plant establishment. Also, wildlife will benefit from the planting until the cattle are allowed to graze the area.

Sesbania and wooly croton are the only two plants listed in the planting tables that cattle will not graze, but their qualities as erosion control plants are low.

Plant Combinations

In an attempt to provide yearlong soil protection, plant combinations of an annual and a perennial are frequently used. It is often difficult without maintenance to obtain a stand of the perennial due to the shading effect of the annual. (For example: ryegrass and bahia grass are planted in the Fall with bahia seed germination expected in the Spring-early Summer. The shading effect of the ryegrass will often times result in a sparse or failure of the bahia stand.) Except on sites highly susceptible to erosion, planting single species of ryegrass, crimson clover or common lespedeza will accomplish the erosion control objectives. These plants are good wildlife plants and the chance of a stand the following year without maintenance is increased when planted singularly.

It is desirable to provide a diversity of plants within each compartment. This can be achieved by alternating the plantings, i.e. ryegrass on the woodland roads and crimson clover on the roads within the clearcuts or plant one road in ryegrass and another in crimson clover.

SEEDING TABLES

FEBRUARY - MAY EROSION CONTROL AND WILDLIFE PLANTING GUIDE FOR THE NATIONAL FORESTS IN MISSISSIPPI

SPECIES AND SEEDING RATE (PER ACRE)	PLANTING DATE	FERTILIZER		LIMING RATE PER ACRE	SUITABILITY		PLOT SIZE	CATTLE STOCKING				SPECIES BENEFITED		
		TYPE	RATE/ACRE		EROSION	FOOD PLOT		N	L	M	H	D	Q	T
Bahia (20 lbs/ac) and Browntop millet (12 lbs/ac)	3/1-5/31	13-13-13	400	1 T	X	-	-	X	-	-	-	-	X	X
Bahia (15 lbs/ac) and Carpet grass (10 lbs/ac)	2/15-5/31	13-13-13	300	1 T	x	-	-	X	X	X	X	-	-	X
Bahia (15 lbs/ac) and Bermuda (hulled) (5 lbs/ac)	5/1-5/31	13-13-13	300	1 T	X	_	_	X	X	X	X	-	-	X
Bahia (15 lbs/ac) and *Common or Kobe Lespedeza (25 lbs/ac)	4/1-5/31	8-24-24	400	1-2 T	X	-	-	X	X	-	-	-	X	X
1/ Bicolor or Thumbergii Lespedeza Seed (16 lbs/ac)	4/1-5/1	8-24-24	400	2-3 T	-	X	1/8	X	-	-	-	X	X	-
Bicolor or Thumbergii Lespedeza Seedlings (8 M/ac)	2/1-3/1	0-24-24	400	2-3 T	-	X	1/8	X	-	-	-	X	X	-
Browntop millet (12 lbs/ac)	4/15-5/31	8-24-24	300	1 T	X	X	1/8-1/4	X	-	-	-	-	X	X
2/ Chufa (50 lbs/ac)	5/1-5/31	8-24-24	300	1 T	-	X	2-5	X	1	1	1	X	X	X
3/ *Common, Kobe or Korean Lespedeza (25 lbs/ac)	4/1-5/31	8-24-24	400	2-3 T	X	X	1/4	X	-	-	-	-	X	X
Lovegrass (clean) (2 lbs/ac)	4/1-5/31	13-13-13	250	-	X	-	-	X	X	X	X	-	-	-
Partridge Peas (15 lbs/ac)	3/15-5/1	8-24-24	300	2-3 T	-	X	1/8-1/4	X	-	-	-	-	X	-
Sesbania (15 lbs/ac(	4/1-5/31	8-24-24	400	2-3 T	-	X	1/8-1/4	X	X	X	X	-	X	-
4/ Wooly Croton (12 lbs/ac)	4/1-5/1	13-13-13	200	-	-	X	1/8-1/4	X	X	X	X	-	X	-

* Innoculate seeds before planting
X Indicates suitable
1/From seeds 2 years before fruiting or from plants 1 year will produce seed
2/Plot locations should be changed every 2 years due to high soil nutrient drain
3/Northern districts use Korean Lespedeza; southern districts use Common or Kobe
4/Seed not available commercially.

N - None
L - Light
M - Moderate
H - Heavy
D - Deer
Q - Quail
T - Turkey

JUNE - AUGUST EROSION CONTROL AND WILDLIFE PLANTING GUIDE FOR NATIONAL FORESTS IN MISSISSIPPI

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SPECIES AND SEEDING RATE (PER ACRE)	PLANTING DATE	FERTILIZER		LIMING RATE PER ACRE	SUITABILITY		PLOT SIZE	CATTLE STOCKING				SPECIES BENEFITED		
		TYPE	RATE/ACRE		EROSION	FOOD PLOT		N	L	M	H	D	Q	T
Bahia (20 lbs/ac) and Browntop millet (12 lbs/ac)	6/1-8/15	13-13-13	400	1 T	X	-	-	X	-	-	-	-	X	X
Bahia (15 lbs/ac) and Bermuda (hulled) (5 lbs/ac)	6/1-7/15	13-13-13	300	1 T	X	-	-	X	X	X	X	-	-	X
1/ Browntop millet (12 lbs/ac)	6/1-8/15	8-24-24	300	1 T	X	X	1/8-1/4	X	-	-	-	-	X	X
2/ Chufa (50 lbs/ac)	6/1-7/1	8-24-24	300	1 T	-	X	2-5	X	-	-	-	X	X	X
Lovegrass (clean) (2 lbs/ac)	6/1-7/1	13-13-13	250	-	X	-	-	X	X	X	X	-	-	-
3/ Orchard grass (20 lbs/ac)	7/1-8/30	13-13-13	300		X	X	-	X	-	-	-	-	X	X

1/ For dove plantings plant at least 5 acres
2/ Plot locations should be changed every 2years due to high soil nutrient drain
3/ Use orchard grass only on the Holly Springs and Tombigbee Districts
X Indicates suitable

N - None
L - Light
M - Moderate
H - Heavy
D - Deer
Q - Quail
T - Turkey

SEPTEMBER - JANUARY EROSION CONTROL AND WILDLIFE PLANTING GUIDE FOR THE NATIONAL FORESTS IN MISSISSIPPI

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SPECIES AND SEEDING RATE (PER ACRE)	PLANTING DATE	FERTILIZER		LIMING RATE PER ACRE	SUITABILITY		PLOT SIZE	CATTLE STOCKING				SPECIES BENEFITED		
		TYPE	RATE/ACRE		EROSION	FOOD PLOT		N	L	M	H	D		T
Bahia (20 lbs/ac) and *Crimson Clover (30 lbs/ac)	9/15-12/1	8-24-24	400	1 to 2 T	X	-	-	X	-	-	-	X	-	X
Bahia (20 lbs/ac) and *Vetch (20 lbs/ac)	9/15-12/1	8-24-24	300	1 to 2 T	X	-	-	X	-	-	-	X	X	X
Bahia (20 lbs/ac) and Ryegrass (20 lbs/ac)	9/15-12/1	13-13-13	300	1 T	X	-	-	X	X	-	-	X	-	X
Bicolor or Thumbergii Lespedeza Seedlings (8M lbs/ac)	12/1-1/31	0-24-24	400	2-3 T	-	X	1/8	X	-	-	-	X	X	-
Carpet grass (15 lbs/ac) and *Crimson Clover (30 lbs/ac)	9/15-12/1	8-24-24	400	1-2 T	X	-	-	X	-	-	-	X	-	X
Carpet grass (15 lbs/ac) and Ryegrass (20 lbs/ac)	9/15-12/1	13-13-13	300	1 T	X	-	-	X	X	-	-	X	-	X
Fescue; KY 31 (20 lbs/ac) and *White clover 9 (2 lbs/ac)	9/15-11/15	13-13-13	400	2-3 T	X	X	-	X	-	-	-	X	-	X
*Crimson Clover (30 lbs/ac)	9/1-11/1	8-24-24	400	2-3 T	-	X	1/4	X	-	-	-	X	X	X
Ryegrass (20 lbs/ac)	9/15-11/15	13-13-13	300	1 T	X	X	1-2	X	-	-	-	X	-	X
Fescue, KY 31 (20 lbs/ac)	9/15-11/15	13-13-13	300	1 T	x	-	-	X	X	-	-	X	-	X
*Vetch (30 lbs/ac)	9/15-11/15	8-24-24	300	2-3 T	-	X	1-2	X	-	-	-	X	X	X
Wheat (80 lbs/ac)	9/1-11/1	13-13-13	400	1 T	X	X	1-2	X	-	-	-	X	X	X

* Innoculate seeds before planting
X Indicates suitable
1/Carpet grass recommended only on the DeSoto National Forest

N - None
L - Light
M - Moderate
H - Heavy
D - Deer
Q - Quail
T - Turkey

PLANT DESCRIPTIONS AND CHARACTERISTICS

Bahia Grass (Paspalum netatum) (perennial)

Site Requirements - Will grow on most areas except the highly alkaline soils. It is best suited to light textured soils and will grow even on nearly sterile and droughty sand. It is widely adapted to lower Coastal Plain soils. Fertilizer is needed to assist in prompt stand establishment. It is more tolerant to conditions of low fertility and provides a more permanent cover in low fertility areas and has a far lower level of maintenance than does Bermuda grass. Some strains will survive winters up to 33° latitude.

Shade Tolerance - Slightly more tolerant than Bermuda grass.

Palatability - It is palatable.

Seeding and General Characteristics - This is a warm season grass best seeded in the spring. Twenty to twenty-five pounds per acre can be used for pure stands. There are about 166,000 seeds per pound. If seeded in the fall a heavier rate is needed. It is slow to become established, especially in cool weather. Seeds should be covered 1/4 to 1/2 inch. Seedbed should be clean and firm.

Bahia grass is a dense, tufted, perennial bunch grass with an enormous root system that grows from 1 to 2 1/2 feet tall. It reproduces by seed and spreads vegetatively by short, heavy runners which form a dense tough sod. Competes well with weeds. Seed is produced in abundance during late summer. Two years are required to establish a sod.

Bahia provides a good turkey bugging area and late summer turkey food.

Bermuda Grass (Cynodon dactylon) (perennial)

Site Requirements - Grows well on most sunny sites where soil fertility is maintained. It grows well on almost any moderately well drained soil that is fertile and not too

wet but does better on heavy soils. Bermuda responds to a complete fertilizer on low fertility soils. Nitrogen is usually the limiting plant food for maximum growth and production. In areas of low soil fertility it can be maintained only with a continuing nitrogen fertility program.

The grass will withstand considerable covering by sediment, will do well in droughty places on steep banks and where heavy traffic is expected.

Shade Tolerance - It will not tolerate much shade or competition from taller plants so it is not too suitable for use on skid trails in dense forest shade. Also it should not be seeded with Love-Grass. It is best used in full sun.

Palatability - Palatability is good, however the grass does not stay green during the winter.

Seeding and General Characteristics - Seeding is best done in the spring and summer as the seedlings are not hardy and can be damaged by hard freezing weather especially during the first winter after seeding. Bermuda can be sprigged as well as seeded.

Because the seeds are small (1,600,000 to the pound) and light, a well prepared seedbed is desirable. Eight to 15 pounds of unhulled seed is the recommended seeding rate in pure stands. If prompt germination is desired hulled seeds should be used.

Bermuda is a longlived, aggressively spreading perennial. Spread is by surface runners, underground rootstocks and in situations to which it is adapted, by seed. It may be seeded throughout the State.

Bermuda may be grown in association with Crimson clover, White clover, and other plants which will not shade it out.

Bermuda is of minor importance to wildlife, but is an excellent plant for erosion control.

Bicolor Lespedeza (perennial) - This is an excellent quail food with the seed lasting through the winter. Heavy deer browsing may occur; thus, reducing seed production. Thumbergii Lespedeza is not susceptible to deer browsing and its growth habit is similar to bicolor. It is an excellent substitute for bicolor where deer browsing is a problem. Seed sources for thumbergii are difficult to locate.

Due to bicolor's rank growth, plant in strips not wider than 15 feet. A strip 15 feet wide and 6 chains long is the recommended plot size. Plant bicolor plants on a 2 by 3 foot spacing.

Bicolor seed is expensive and should not be planted unless maintenance is planned. Maintain by mowing in late February the second year after planting. Mow every other year or as needed to keep the bicolor canopy closed. Burning in late February will help control invading vegetation. Fertilize at time of mowing with 0-20-20 at 400 pounds per acre or its equivalent.

Browntop Millet (annual) - This is a good planting for doves and will provide quail with a late summer food. Browntop's rapid seed germination and growth make it an excellent plant where quick soil stability is needed. Also, the plant will serve as a mulch in the winter providing additional soil protection.

When planting for doves, plant approximately 75 days prior to opening of the season. Mow or disc the browntop in strips approximately two weeks before opening of the season. If not planted in combination with a grass, browntop will usually reseed itself the second year. Additional fertilizer and light discing are desirable. Reseed and fertilize annually to ensure a stand.

Carpet-Grass (Axonopus affinis) (perinnial)

Site Requirements - Grows on moist mucky soils and sandy flats and is especially adapted to sandy or sandy loam soils, particularly where the moisture is near the surface most the year. This grass should be used only in the southern most part of the State. It will thrive on rather poor, acid soils with a minimum of upkeep.

Shade Tolerance - Probably not particularly tolerant but is suitable for use along roads and open areas in the forest.

Palatability - Very palatable, but is low in nutritive value. It should be used where there is intense grazing pressure as it survives grazing well. When closely grazed it forms a very dense compact sod in which it is difficult to introduce other grasses or legumes.

Seeding and General Characteristics - Carpetgrass is usually sown 5 to 10 pounds to the acre. It can be sown on a well prepared seedbed or on burned over areas in timberland. Seeding is best done in spring, early summer or even in mid-summer. One pound of seed contains about 1,350,000 seeds. A dense sod is formed, even on sandy soils, by its compressed two-edged, creeping stems which root at each joint, and by its blunt leaf tips.

Crimson Clover - (Trifolium incarnatum)

Site Requirements - This legume will grow on almost all fertile, well drained soils from sands to heavy clays with varying acidity and alkalinity. Does best on well drained clays or loams. It can be grown on the well drained, heavier type soils of the Coastal Plain provided the fertility level is built up and enough moisture is available. It will not do well on flat, poorly drained sandy soils. It prefers cool humid weather and is adopted mainly for use in the Upper Coastal Plain and Delta, although it can be grown successfully on the lower coastal plain.

Crimson clover is a heavy user of phosphate. It responds well to fertilizer.

Shade Tolerance - Average

Palatability - All classes of livestock relish it. It is also used by wild animals and birds.

Seeding and General Characteristics - Seed in early fall. For pure stands use 15 to 25 pounds of inoculated seed per acre on a firm seedbed. There are about 140,000 seeds per pound.

Crimson clover is an upright winter annual legume which grows to a height of 1 to 3 feet. It does best in cool moist weather. The seeds form in the early spring and the plant usually dies during the summer months. Roots may penetrate to a depth roughly equal to the plant's height.

It is an excellent early Spring turkey food, and is highly recommended for erosion control where turkey is the featured species. Crimson clover does best in open sunlight. When planted in combination with a grass, it may not last past the second or third growing season without maintenance.

Chufa (annual) - This is an excellent turkey and deer food. Also, quail will take readily. Seed production may range as high as 3000 pounds per acre. Wildlife will consume most of the seed; thus, to obtain a satisfactory stand, annual seeding is usually necessary. Plant chufa on sandy soils.

Chufa plot locations should be changed every few years to avoid excessive soil nutrient drain. This plant is not recommended for erosion control due to the soil disturbance resulting from animal activity.

Kentucky Fescue (Festuca elatior arundinacea - KY 31) (perennial)

Site Requirements - A cool season grass best suited to the northern two-thirds of the state of Mississippi. Although it has been grown successfully on the DeSoto and Homochitto National Forests. Suited for use on skid trails, road banks and general watershed restoration work especially in areas too shady for Bermuda. Another variety of Fescue, Artrens, being tested by the SCS, should be well suited to the southern 1/3 of the state.

Produces good results under poor soil conditions. It is moderately drought resistant and is adaptable to a wide range of soil types, soil reactions and fertility levels. It responds well to fertilizer. Not adapted to deep sandy soils.

Shade Tolerance - This grass is tolerant to both shade and sun.

Palatability - Palatible to game and domestic stock when young and tender. During the summer months it becomes tough and furnishes little grazing. It has low nutritive value.

Germination - Best seeded early fall and early spring, but can be seeded any season on the more favorable sites. Seed germinates promptly. The seedlings are fairly rugged and grow rapidly. This is a cool season grass that stays green and grows throughout most the year. It is a fairly large and robust, mildly sodforming, longlived perennial. It does not have runners or Rhyzomes but the clumps stool out to a diameter of several inches. Thus the tough fiberous roots of one mature plant can protect up to a square foot of soil.

Seeding rate for a pure stand of KY 31 is 15-25 pounds per acre. There are about 227,000 seeds per pound.

KY 31 may be grown in association with other plants such as White clover, the lespedeza's, etc.

Annual Lespedezas - (Common, Kobe, and Korean) (annual)

Site Requirements - These lespedezas are adapted to most sites except deep sands, wet or lime soils. They are useful on acid soils of poor fertility and for improving poor soils. Fertilizer, especially phosphates and potash, is of value. Common and Kobe are better adapted to the southern part of Mississippi, while Korean is better adapted to the northern districts.

Avoid planting on areas heavily grazed in spring, summer and fall.

Shade Tolerance - Common on open sites but occurs rarely under timber stands unless seeded.

Palatability - Suitable for livestock grazing. It is a choice food for Bobwhite, but only fair for Doves and turkeys. It is not important for other birds. Deer graze Annual lespedezas sparingly.

Seeding and General Characteristics - Seed in early spring 2 to 4 weeks before the expected date of the last spring frost. Seed (with hulls on) 10 to 15 pounds of Common or Kobe or 20 to 25 pounds of Korean per acre. The plants will usually reseed themselves for several years. They provide a quick temporary cover under practically all conditions and are also useful as a nurse crop for more permanent grasses or ground cover.

Common and Kobe (which is a variety of Common) would be best in the south and central part of the State, while Korean would be best for northern areas.

These species are excellent insect producers providing good bugging areas for turkey and quail. They provide early spring greens for both turkey and quail and a good winter seed for quail. Common is the best variety for planting where cattle graze and will last longer than kobe without maintenance. Common seed may be difficult to obtain and is more expensive than kobe. Usually, Kobe will not last past the second year when planted with a grass. Common may last longer. When planted singularly, they may last three years without maintenance. If planted as a food plot, maintain by discing and/or burning and fertilizing with 0-20-20 at 400 pounds per acre or its equivalent every two years. Do maintenance in February before seed germination. Reseeding will probably be necessary every two to four years.

These Leapedezas will serve as a good erosion control species when planted singularly. Where quail are the featured species common or Kobe should be used singularly as the erosion control plant.

Weeping Love-Grass (Eragrostis curvula) (perennial)

Site Requirements - It can be used on extremely tough sites and will make good cover on practically any soil type if it is well fertilized. While it does do well on most any type of well drained soil, it prefers alkaline sandy loams. Its acidity tolerance is slight. This grass responds to nitrogen and phosphate fertilizers with additional forage and increases in protein.

It is good for use in gully bottoms as it will withstand considerable deposition. In fact this sedimentation may tend to regenerate the stand since in heavy stands and fertile sites the decay resistant leaves tend to smother the plants out in a few years.

Once established it will withstand considerable drought.

Shade Tolerance - Love-Grass is tolerant to moderate shade and hot sun.

Palatability - It can produce pasture during the spring and fall if grazed close enough to keep the forage tender; however, generally palatability is low and it does not attract animals to any great extent.

Seeding and General Characteristics - It is primarily a spring grass but may be seeded until late summer. Since the seed is very fine (1,463,000 per pound) and smooth, it is rather difficult to handle with ordinary equipment. Seeding rate is 5 pounds per acre in a mixture and 20 pounds alone.

This grass is a warm season or summer perennial bunch grass which grows to a height of 2 to 4 feet. It makes rapid early growth and is dormant during the winter months.

The grass does not seem to produce much seed or to propogate itself too well. However, it is usually easily established and spreads by tillering. A single plant may form a dense sod bunch 15 to 25 inches in diameter within two to three years. Maintenance applications of fertilizer will improve seed production. This grass is to be limited to active gullies or where excessive siltation is occurring.

In some areas the grass could present a fire hazard during its dormant period.

Orchard-Grass (Dactylis glomerata)

Site Requirements - Similar to Kentucky Fescue in its requirements. Use in North Mississippi only. It responds to soil fertility but will grow on a variety of soils. The grass does not thrive on Coastal Plain sandy soils.

Shade Tolerance - It is shade tolerant and will grow in denser shade than almost anything else.

Palatability - Orchard grass is highly palatable for game and livestock.

Seeding and General Characteristics - Seed in early fall or spring. Seedlings develop fairly fast. Seed 10 to 15 pounds per acre. There are about 532,000 seed per pound.

This is a medium sized, perennial bunch grass with a moderate life span, but it reproduces well by natural seeding on areas to which it is well adapted. An irregular sod is formed of tufted roots held together by short rhizomes. It is a cool season grass but it is not as active as Kentucky 31 during cold weather. May be used in combination with Kentucky 31, White clover, Annual Lespedeza or Redtop.

Partridge Pea (Chamaecrista fasciculata))annual)

Site Requirements - Grows naturally on practically all soils throughout the State except wet sites and is fairly common on sandy loam soils. It normally grows in dense stands in old fields or disturbed areas but occurs as scattered plants where the grass stand is open enough for invasion. Deep sterile sands should not be planted.

Shade Tolerance - Avoid planting in dense shade or areas heavily grazed by livestock in spring, summer, and early fall.

Palatability - Livestock will graze Partridge pea in pasture or woodland and eventually eliminate it. The seeds are a choice food for Bobwhite quail. They are particularly important for this bird as the seeds remain sound through the winter and early spring.

Seeding and General Characteristics - Plant seed in February or early March as seeds will not germinate at high temperatures. It is best to seed on a prepared seedbed. While the plant will grow on poor soil, fertilizer should be used. Use about 15 pounds of seed per acre.

Partridge pea responds well to prescribed burning. Annual maintenance is usually necessary to keep a satisfactory stand.

Perennial Ryegrass (Loluim perenne)
Italian Ryegrass (Loluim multiflorum)

Site Requirements - Both grasses are adapted to a wide range of soils but prefer those of medium to high fertility.

If well fertilized they give quick cover to protect the soil during the winter. Italian Ryegrass is good for only temporary or winter cover. Perennial Ryegrass is preferable on skid trails and disturbed areas where native plants may be expected to take over in 2 to 3 years. Ryegrass retards permanent grasses in spring because of competition for moisture and fertilizer.

Shade Tolerance - Both are shade tolerant grasses.

Palatability - They are highly palatable to animals and certain birds. Ryegrasses are good winter grazing plants for deer and turkey.

Seeding and General Characteristics - The Ryegrasses are a rapid growing cool season bunch grass that grow to a height of 2 to 3 feet and have good root systems. They are adqpted to early fall seeding and to winter growth. They are of value in mixtures for fall seeding to give quick cover and serve too as a temporary filler while slower growing long-lived perennials are developing. Ryegrass if used, should be used with care, as it may prevent other species from getting a start in the spring.

Short-lived perennial Ryegrass is good for 2 to 3 years while Italian Ryegrass is strictly a winter annual.

If mixed with other species don't use over 3-5 pounds per acre as heavier rates are likely to crowd out the permanent plants. If seeded alone use 15 to 20 pounds per acre. Perennial ryegrass has about 227,000 seeds per pound.

Sericea (Lespedeze) (Lespedeza sericea)

Site Requirements - Sericea grows on a wide variety of sites from the coast to the mountains, but is not very well suited to sandy soils in the lower Coastal Plains.

The heavy, deep growing taproots are valuable on steep slopes where soil sliding is a problem.

It withstands moisture and drought.

Shade Tolerance - Tolerant to shade and to sun.

Palatability - Not very attractive to game animals or livestock.

Seeding and General Characteristics - Seed does not germinate promptly. For fall seeding in mixture use natural seed, for spring seeding use scarified seed. Seeding rate is 10 to 20 pounds per acres. There are about 350,000 seeds per pound.

Seedlings develop slowly. They often take a year or two to become established, however, once established they furnish fierce competition for other plants. An established area of Sericea is likely to interfere with natural tree reproduction.

Sericea is a rugged, tall growing, longlived perennial legume. It has limited erosion control value when growing along in the open because of its erect growth habit. If used in open areas it should be seeded with a grass such as Kentucky Fescue or Weeping Love-Grass. Kentucky Fescue will last longer in the stand than will Love grass.

Sericea should not be used in recreational areas as it is aesthetically unappealing.

It is satisfactory for erosion control use in forested areas as here the persistent stems trap tree leaves and pine needles and thus increase the soil protection. However, seeding with a grass is also recommended for forested areas.

White Clover - (Trifolium repens)

Site Requirements - White clover is adapted to a wide range of soils including wet and hardpan soils; however, it is best suited to fertile, moist clay or loam soils that have nearly neutral pH. Light textured droughty soils of medium to low fertility or extremely wet soils are not satisfactory. White clover will tolerate some acidity in the soil but requires liming on acid soils.

There are three main varities:

Ladino - the tallest and most productive
Louisiana White - Medium height, best adapted to hot weather
White Dutch - Shortest, most rugged except in the hottest areas.

White clover requires adequate quantities of available phosphorus, potash and calcium.

Shade Tolerance - Average

Palatability - It is highly palatable to all animals and birds.

Seeding and General Characteristics - Seeding can be done any season but is best not done during the heat of summer. Planting rate is 2 to 5 pounds per acre. There are about 800,000 seeds per pound. It should not be covered more than 1/4 inch. Site should be prepared by discing or similar method. Inoculate seed with White clover inoculant if possible. Use scarified seed for prompt germination. If it is desired to spread out germination period as for fall and winter seeding, use natural seed.

White clover is orginarily a long lived perennial legume but in most of Mississippi it acts as a cool season annual. It is shallow rooted and spreads by creeping stolons which root at the nodes and by seeds.

Common associates of White clover may be Bermuda, Bahia, Fescue, and Ryegrass. Only the short varities of White clover should be seeded with Bermuda.

Sesbania (annual) - Quail will eat the seeds. Where successive plantings of sesbania have been made, it has contributed substantially to the winter diet of quail. Plant in plots 1/8 acre in size. Sesbania has to be replanted annually and should be planted on moist soils.

Vetch (annual) - Vetch is a legume, normally planted in combination with a perennial grass to provide yearlong erosion control. It will not last past the second year when planted in combination. Turkey, deer, and quail will use as a late winter and early spring green.

Wheat (Annual) - Wheat is an excellent winter grass for turkey and deer. Also, the seed is readily taken by numerous wildlife species. It will provide a quick, temporary cover in the fall.

Wild Winter Peas (annual) - This species offers opportunities for fall planting of a winter seed plant for quail. Deer will browse readily.

Wooly Croton (annual) - The principal advantage of the species is that cattle will not graze. Quail and dove will eat the seeds. Croton will naturally reseed. The seed is not available commercially.

SEED SOURCES

R. E. Lambert & Son
Darlington, Alabama 36730
Phone: 205-682-4466

Sawan Seed Company
P. O. Box 151
Columbus, MS 39701
Phone: 601-328-5010

Montgomery Seed & Supply Co., Inc.
P. O. Box 867
Montgomery, Alabama 36102
Phone: 205-265-8241